

FIG. 1

	A	B	C	D	E	F	G	H	I	J	K
TOLUENE	90	90	90	90	90	90	90	90	45	90	90
METHYLETHYL KETONE	90	90	90	90	90	90	90	90	135		90
FM-0721	10	10	10	10	10	10	20	10	30	10	
MMA	35	55	50	10	5	35	30	35	20	65	15
SMA(C18)	30	10	15	55	60						60
LMA(C12)						30	30				
BEHENYL METHACRYLATE (C22)								30	30		
HEMA	12.5	12.5	12.5	12.5	12.5	12.5	10	12.5	10	12.5	12.5
MAA	12.5	12.5	12.5	12.5	12.5	12.5	10	12.5	10	12.5	12.5
ABN-E	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TOLUENE	10	10	10	10	10	10	10	10	5	10	10
METHYLETHYL KETONE	10	10	10	10	10	10	10	10	15	10	10
ABN-E	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

A: RESIN SOLN. (1) GRAFT COPOLYMER (1)  
 B: RESIN SOLN. (2) GRAFT COPOLYMER (2)  
 C: RESIN SOLN. (3) GRAFT COPOLYMER (3)  
 D: RESIN SOLN. (4) GRAFT COPOLYMER (4)  
 E: RESIN SOLN. (5) GRAFT COPOLYMER (5)  
 F: RESIN SOLN. (6) GRAFT COPOLYMER (6)

G: RESIN SOLN. (7) GRAFT COPOLYMER (7)  
 H: RESIN SOLN. (8) GRAFT COPOLYMER (8)  
 I: RESIN SOLN. (9) GRAFT COPOLYMER (9)  
 J: RESIN SOLN. (10) GRAFT COPOLYMER (10)  
 K: RESIN SOLN. (11) GRAFT COPOLYMER (11)

\*ALL NUMERIC VALUES FOR COMPONENTS INDICATED BY PARTS BY WT.

FM-0721: Manufactured by Chisso Corporation

Trade name (Polydimethylsiloxane containing a methacrylic group at one end, length of silicon chain: 5,000)

MMA: METHYL METHACRYLATE

SMA: STEARYL METHACRYLATE

LMA: LAURYL METHACRYLATE

HEMA: HYDROXYETHYL METHACRYLATE

MAA: METHACRYLIC ACID

ABN-E: Manufactured by Japan Hydrazine Co., Inc.

Trade Name (2,2-azobis(2-methylbutyronitrile))

FIG. 2

	EX. 1	EX. 2	EX. 3	EX. 4	EX. 5	EX. 6	EX. 7	EX. 8	EX. 9	EX. 10	C.1	C.2	C.3
RESIN SOLN. 1 (GRAFT COPLYM. 1)	100									75			
RESIN SOLN. 2 (GRAFT COPLYM. 2)		100											
RESIN SOLN. 3 (GRAFT COPLYM. 3)			100										
RESIN SOLN. 4 (GRAFT COPLYM. 4)				100									
RESIN SOLN. 5 (GRAFT COPLYM. 5)					100								
RESIN SOLN. 6 (GRAFT COPLYM. 6)						100							
RESIN SOLN. 7 (GRAFT COPLYM. 7)							100						
RESIN SOLN. 8 (GRAFT COPLYM. 8)								100					
RESIN SOLN. 9 (GRAFT COPLYM. 9)									100				
RESIN SOLN. 10 (GRAFT COPLYM. 10)											100		50
RESIN SOLN. 11 (GRAFT COPLYM. 11)												100	50
20% polyvinyl acetal methyl ethyl ketone solution										25			
METHYL ETHYL KETONE	380	380	380	380	380	380	380	380	380	380	380	380	380
CYCLOHEXANE	20	20	20	20	20	20	20	20	20	20	20	20	20

EX.: EXAMPLE

C. : COMPARATIVE EXAMPLE

COPLYM. : COPOLYMER

\*ALL NUMERIC VALUES FOR COMPONENTS INDICATED BY PARTS BY WT.

FIG. 3

	A	B	C	D	E	F	G	H	I	J	K
TOLUENE	100	100	100	100	100	100	100	100	50		100
METHYLETHYL KETONE	100	100	100	100	100	100	100	100	150	200	100
VPS1001	10	10	10	10	10	10	20	10	30	10	
MMA	35	55	50	10	5	35	30	35	20	65	15
SMA(C18)	30	10	15	55	60						60
LMA(C12)						30	30				
BEHENYL METHACRYLATE (C22)								30	30		
HEMA	12.5	12.5	12.5	12.5	12.5	12.5	10	12.5	10	12.5	12.5
MAA	12.5	12.5	12.5	12.5	12.5	12.5	10	12.5	10	12.5	12.5
ABN-E	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

A: RESIN SOLN. (12) BLOCK COPOLYMER (1)  
 B: RESIN SOLN. (13) BLOCK COPOLYMER (2)  
 C: RESIN SOLN. (14) BLOCK COPOLYMER (3)  
 D: RESIN SOLN. (15) BLOCK COPOLYMER (4)  
 E: RESIN SOLN. (16) BLOCK COPOLYMER (5)  
 F: RESIN SOLN. (17) BLOCK COPOLYMER (6)

G: RESIN SOLN. (18) BLOCK COPOLYMER (7)  
 H: RESIN SOLN. (19) BLOCK COPOLYMER (8)  
 I: RESIN SOLN. (20) BLOCK COPOLYMER (9)  
 J: RESIN SOLN. (21) BLOCK COPOLYMER (10)  
 K: RESIN SOLN. (22) BLOCK COPOLYMER (11)

\*ALL NUMERIC VALUES FOR COMPONENTS INDICATED BY PARTS BY WT.

MMA: METHYL METHACRYLATE  
 SMA: STEARYL METHACRYLATE  
 LMA: LAURYL METHACRYLATE  
 HEMA: HYDROXYETHYL METHACRYLATE  
 MAA: METHACRYLIC ACID  
 VPS1001: Manufactured by Wako Junyaku Co., Ltd.  
 Trade Name: an azo-group-containing polydimethylsiloxane amide, length of silicon:10,000  
 Manufactured by Japan Hydrazine Co., Inc.  
 ABN-E: Trade Name (2,2-azobis(2-methylbutyronitrile))

FIG. 4

	EX. 11	EX. 12	EX. 13	EX. 14	EX. 15	EX. 16	EX. 17	EX. 18	EX. 19	EX. 20	C.4	C.5	C.6
RESIN SOLN. 12 (BLOCK COPLYM. 1)	100									75			
RESIN SOLN. 13 (BLOCK COPLYM. 2)		100											
RESIN SOLN. 14 (BLOCK COPLYM. 3)			100										
RESIN SOLN. 15 (BLOCK COPLYM. 4)				100									
RESIN SOLN. 16 (BLOCK COPLYM. 5)					100								
RESIN SOLN. 17 (BLOCK COPLYM. 6)						100							
RESIN SOLN. 18 (BLOCK COPLYM. 7)							100						
RESIN SOLN. 19 (BLOCK COPLYM. 8)								100					
RESIN SOLN. 20 (BLOCK COPLYM. 9)									100				
RESIN SOLN. 21 (BLOCK COPLYM. 10)											100		50
RESIN SOLN. 22 (BLOCK COPLYM. 11)												100	50
20% polyvinyl acetal methyl ethyl ketone solution										25			
METHYL ETHYL KETONE	380	380	380	380	380	380	380	380	380	380	380	380	380
CYCLOHEXANE	20	20	20	20	20	20	20	20	20	20	20	20	20

EX.: EXAMPLE

C.: COMPARATIVE EXAMPLE

COPLYM.: COPOLYMER

\*ALL NUMERIC VALUES FOR COMPONENTS INDICATED BY PARTS BY WT.

FIG. 5

	EX. 1	EX. 2	EX. 3	EX. 4	EX. 5	EX. 6	EX. 7	EX. 8	EX. 9	EX. 10
Appearance of Resin Solution	X	X	X	X	X	X	X	X	X	X
Appearance of Heat-resistant Lubricity Imparting Coating Agent	Y	Y	Y	Y	Y	Y	Y	Turbid	Turbid	Y
Appearance of Heat-resistant Lubricous Protective Layer	Not turbid	Not turbid	Not turbid	Not turbid	Not turbid	Not turbid	Not turbid	Slightly turbid	Slightly turbid	Not turbid
Sticking	O	O	O	O	O	O	O	O	O	O
Head Chippings (on the head electrical heating element)	O	O	O	O	O	O	O	O	O	⊙
Head Chippings (Dropped Chips)	O	Δ	□	O	O	O	O	O	O	⊙
Offset	O	O	O	O	O	O	O	Δ	Δ	O
Blocking	O	O	O	□	Δ	□	O	O	O	O

X: Milky white and transparent, Y: Colorless and transparent

&lt;Sticking&gt;

O: No wrinkles, Δ: Wrinkles occur to affect printing., X: Large wrinkles occur to make traveling impossible.

&lt;Head Chippings (on the head electrical heating element)&gt;

⊙: Nothing fusion-bonded, O: A few fusion-bonded materials (not affecting printing), X: Fusion-bonded materials(defective printing)

&lt;Head Chippings (Dropped Chips)&gt;

⊙: No white particles, O: A few white particles (not affecting printing), □: Slight deposition of white particles(not affecting printing)

Δ: Deposition of white particles (slightly affecting printing, while being able to be removed easily with alcohol)

X: Deposition of white particles (defective printing)

&lt;Offset&gt;

⊙: Little change in contact angle, and no rejection of ink

O: Change in contact angle of less than 5 °, and no rejection of ink

Δ: Change in contact angle of 5 ° or more, and less than 15 °, and slight rejection of permanent marker ink

X: Change in contact angle of 15 ° or more, and rejection of heat sensitive ink as well as permanent marker ink

&lt;Blocking&gt;

O: No blocking, □: Slight blocking occurring in a spot-like manner (not affecting printing)

Δ: Much blocking occurring in a spot-like manner, X: Occurrence of blocking in a planar manner (defective printing)

FIG. 6

	EX. 11	EX. 12	EX. 13	EX. 14	EX. 15	EX. 16	EX. 17	EX. 18	EX. 19	EX. 20
Appearance of Resin Solution	X	X	X	X	X	X	X	X	X	X
Appearance of Heat-resistant Lubricity Imparting Coating Agent	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Appearance of Heat-resistant Lubricous Protective Layer	Not turbid	Not turbid	Not turbid	Not turbid	Not turbid	Not turbid	Not turbid	Slightly turbid	Slightly turbid	Not turbid
Sticking	O	O	O	O	O	O	O	O	O	O
Head Chippings (on the head electrical heating element)	O	O	O	O	O	O	O	O	O	⊙
Head Chippings (Dropped Chips)	O	Δ	□	O	O	O	O	O	O	⊙
Offset	⊙	⊙	⊙	⊙	O	⊙	⊙	O	O	⊙
Blocking	O	O	O	□	Δ	□	O	O	O	O

X: Milky white and transparent, Y: Colorless and transparent

<Sticking>

O: No wrinkles, Δ: Wrinkles occur to affect printing., X: Large wrinkles occur to make traveling impossible.  
<Head Chippings (on the head electrical heating element)>

⊙: Nothing fusion-bonded, O: A few fusion-bonded materials (not affecting printing), X: Fusion-bonded materials(defective printing)  
<Head Chippings (Dropped Chips)>

⊙: No white particles, O: A few white particles (not affecting printing), □: Slight deposition of white particles(not affecting printing)  
Δ: Deposition of white particles (slightly affecting printing, while being able to be removed easily with alcohol)  
X: Deposition of white particles (defective printing)

<Offset>

⊙: Little change in contact angle, and no rejection of ink

O: Change in contact angle of less than 5 °, and no rejection of ink

Δ: Change in contact angle of 5 ° or more, and less than 15 °, and slight rejection of permanent marker ink

X: Change in contact angle of 15 ° or more, and rejection of heat sensitive ink as well as permanent marker ink

O: No blocking, □: Slight blocking occurring in a spot-like manner (not affecting printing)

Δ: Much blocking occurring in a spot-like manner, X: Occurrence of blocking in a planar manner (defective printing)

FIG. 7

	C. 1	C. 2	C. 3	C. 4	C. 5	C. 6
Appearance of Resin Solution	X	Y	Turbid	X	Y	Turbid
Appearance of Heat-resistant Lubricity Imparting Coating Agent	Y	Y	Y	Y	Y	Y
Appearance of Heat-resistant Lubricous Protective Layer	Not turbid	Not turbid	Turbid	Not turbid	Not turbid	Turbid
Sticking	O	X	Δ	O	X	Δ
Head Chippings (on the head electrical heating element)	O	O	X	O	O	X
Head Chippings (Dropped Chips)	X	O	O	X	O	O
Offset	O	O	X	⊙	O	X
Blocking	O	X	□	O	X	□

X: Milky white and transparent, Y: Colorless and transparent

<Sticking>

O: No wrinkles, Δ: Wrinkles occur to affect printing.; X: Large wrinkles occur to make traveling impossible.  
<Head Chippings (on the head electrical heating element)>

⊙: Nothing fusion-bonded, O: A few fusion-bonded materials (not affecting printing), X: Fusion-bonded materials(defective printing)  
<Head Chippings (Dropped Chips)>

⊙: No white particles, O: A few white particles (not affecting printing), □: Slight deposition of white particles(not affecting printing)

Δ: Deposition of white particles (slightly affecting printing, while being able to be removed easily with alcohol)  
X: Deposition of white particles (defective printing)

<Offset>

⊙: Little change in contact angle, and no rejection of ink

O: Change in contact angle of less than 5 °, and no rejection of ink

Δ: Change in contact angle of 5 ° or more, and less than 15 °, and slight rejection of permanent marker ink

X: Change in contact angle of 15 ° or more, and rejection of heat sensitive ink as well as permanent marker ink

O: No blocking, □: Slight blocking occurring in a spot-like manner (not affecting printing)

Δ: Much blocking occurring in a spot-like manner, X: Occurrence of blocking in a planar manner (defective printing)